

REMARKS

This paper is filed in response to the office action mailed on August 27, 2003. Claim 1, 3, 5, 8-11 and 24 have been amended; claims 1, 3, 5-13 and 24 are pending.

In the office action, claims 3, 5 and 8-10 are objected to for use of the term "about." Applicants respectfully submit that the term "about" has been used extensively in chemical patent cases in the United States for decades. The term is not indefinite. However, do expedite the prosecution of this application, the term "about" has been eliminated from claims 5 and 8-10. The dependencies of claims 5 and 9-11 have also been corrected.

Turning to the rejections based on upon the prior art, the Patent Office rejects claims 1, 3, 5-6, 8-13 and 24 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,551,935 ("Sinha"). Applicants respectfully submit that this rejection is improper because Sinha is directed exclusively to slurries for polishing copper structures. In stark contrast, independent claims 1 and 24 are directed toward slurries for polishing ruthenium thin films and ruthenium alloy thin films. Ruthenium is a noble metal and reacts very differently to slurries than copper.

Applicants respectfully submit that this limitation appearing in the preamble gives "life and meaning" to independent claims 1 and 24 and defines the claimed slurry. In re Wertheim, 191 U.S.P.Q. 90, 102 (C.C.P.A. 1976). The Federal Circuit has held that the preamble limits the scope of a claim when patentability depends upon limitations stated in the preamble, In re Stencil, 4 U.S.P.Q.2d 1071, 1073 (Fed. Cir. 1987), or when the preamble contributes to the definition of the claimed invention, as set forth in Bell Communications Research, Inc. v. Vitalink Communications Corp., 34 U.S.P.Q.2d 1816, 1820 (Fed. Cir. 1995). In this case, the claimed invention is a CMP slurry directed towards use on ruthenium thin films or ruthenium alloy thin films.

As noted above, Sinha is directed toward a slurry for copper. Each embodiment of Sinha requires the presence of "at least one inhibitor," see column 3, line 12 and column 5, lines 52-67. Sinha requires the use of a corrosion inhibitor because copper is very susceptible to corrosion. In stark contrast, ruthenium is a noble metal that is extremely corrosion resistant. Ruthenium alloys are also very corrosion resistant. Thus, claims 21 and 24 include a strong oxidizer CAN and a strong acid. If the slurry of claims 1 or 24 were applied to copper or tungsten, severe

dishing or erosion on the copper or tungsten surfaces would occur since the rate of corrosion would be too fast to control effectively. To solve this problem, Sinha relies a copper corrosion inhibitor in each disclosed embodiment. In contrast, independent claims 1 and 24 require the slurry to be exclusive or corrosion inhibitors thereby traversing the anticipation rejection.

Thus, claims 1 and 24 are allowable over Sinha for two separate reasons. First, their preambles relegate their use to ruthenium thin films and ruthenium alloy thin films, which therefore distinguish these claims from Sinha. Second, the claims require the slurries be free of corrosion inhibitors, which further distinguish these claims from Sinha.

Accordingly, in view of the amendments to claims 1 and 24, applicants respectfully submit that the anticipation rejections based upon Sinha are improper and should be withdrawn.

Next, the office action rejects claims 1, 3 and 5-11 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,491,837 ("Liu"). In response, applicants present the following remarks.

At the outset, Liu discloses the use of ceric ammonium nitrate (CAN) as a co-oxidizer only. Each Liu formulation requires multiple oxidizers included at least one oxidizer and at least one co-oxidizer. See column 3, lines 1-14 and independent claims 1 and 27. See also the low removal rates of the samples in table 1 of Liu but do not include both an oxidizer and a co-oxidizer.

In contrast, independent claims 1 and 23 require the oxidant to consist essentially of ceric ammonium nitrate (claim 1) or the single oxidant to consist essentially of ceric ammonium nitrate (claim 24). Because Liu is directed entirely toward a multiple oxidant formulation, the anticipation rejection based upon Liu is improper and should be withdrawn.

Further, Liu is directed toward a slurry for nickel which, like copper, has a weak corrosion resistance. Because Liu is directed toward nickel surfaces, Liu provides no examples using the acids recited in claims 1 and 24 the oxidizer ceric ammonium nitrate recited in claim 1. Giving weight to the preamble of claims 1 and 24, these claims are not anticipated by Liu for this additional reason as Liu being directed toward nickel surfaces and claims 1 and 24 being directed toward ruthenium

and ruthenium alloy thin films. Accordingly, applicants respectfully submit that the anticipation rejections based upon Liu are improper and should be withdrawn.

Next, claim 7 is rejected under 35 U.S.C. § 103 as being unpatentable over Sinha in view of U.S. Patent No. 6,375,545 ("Yano"). Yano is cited for the proposition that it teaches a slurry with abrasive particles below 1 micron in size. However, Yano cannot supplement Sinha with respect to any of the other deficiencies recited above. Yano does not teach or suggest cerium ammonium nitrate as a sole oxidizer. Yano does not teach or suggest the use of the acids recited in claim 1. Yano does not teach or suggest any slurry formulation for ruthenium films. The primary contribution of Yano lies in its use of polymer particles to reduce scratching of the copper, tungsten or aluminum or silicon oxide film. Therefore, in light of the deficiencies of Sinha, applicants respectfully submit that the obviousness rejection based upon Sinha and Yano is improper and should be withdrawn.

Next, claims 1, 3, 5-13 and 24 are provisionally rejected under 35 U.S.C. § 101 in view of certain claims of co-pending application number 10/096,266. Application serial number 10/096,266 has been abandoned and a divisional application has been filed in lieu thereof directed toward restricted method claims. Because of the recent filing of the divisional application, applicants do not have a serial number to report. Thus, applicants respectfully submit that the provisionally double patenting application be held in abeyance.

In view of the above, applicants respectfully submit that this application is in a condition for allowance and an early action so indicating is respectfully requested.

The Commissioner is authorized to charge any fee deficiency required by this paper, or credit any overpayment, to Deposit Account No. 13-2855.

Respectfully submitted,

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By: